Fermilab

Radiation Physics Note #33

November 7, 1980

To: Distribution

From: S. Velen SV

Subject: Beam Losses

What is the consequence of allowing a loss monitor to stay saturated? As you can see from the attached graph, it is a function of the beam intensity; the length of time the loss monitor is saturated and the time between the high loss and the radiation measurement (cool off).

For example, if a beam of 10^{11}ppp is lost on a collimator for 10 minutes, the dose rate at one foot after one hour cool off would be about 60 mrem/hr, and after 12 hours cool off would be about 6 mrem/hr. Since the dose rate scales directly with beam intensity, if the beam intensity was 10^{12}ppp, the dose rate after 1 hour cool off would be 600 mrem/hr.

If the beam intensity was 10^{13}ppp and the loss condition lasted for 2 minutes, then the dose rate after one hour of cool off would be about 270 mrem/hr at one foot, and after 12 hours of cool off about 25 mrem/hr.

From the above examples some general guidelines can be extracted. They are:

1. At 10^{13}ppp or greater, reduce losses or intensity immediately (< 1 min.). In addition to high radiation levels, beam elements can be damaged.

2. At 5×10^{12}ppp limit high losses to 3 minutes.

3. At 5×10^{11}ppp limit high losses to 10 minutes.

If work is to be done in the loss area within a day of cool off, the time the loss monitors are saturated must be shortened. If no work is expected in the area for many days, the loss period may be lengthened. If you are not sure of what you should do, i.e., you don't know if work is scheduled in the loss area, contact S. Velen, K. Stanfield, or P. Garbincius.

SV/be

Distribution:

Operations	K. Stanfield	M. Gerardi
J. Hawkins	J. Butler	L. Coulson
P. Garbincius	S. Benesch	D. Grobe

MREM/hr at 1' for 10^{12} ppp (Dose Rate Scales with Intensity)